

**REMARKS**

**I. Claim Status**

Claim 1 is currently pending.

**II. Rejection under 35 U.S.C. § 103 (a)**

**1. Wiktorowicz in view of Zanzucchi, Simpson, and Cahill**

The Office maintains the rejection of claim 1 under 35 U.S.C. § 103 (a) over U.S. Patent No. 6,214,191 to Wiktorowicz ("Wiktorowicz") in view of U.S. Patent No. 5,755,942 to Zannzucchi et al. ("Zannzucchi"), U.S. Patent No. 6,143,152 to Simpson et al. ("Simpson"), and European Patent Application Publication No. EP 1 044 716 to Cahill et al. ("Cahill") for the reasons of record. See Office Action at pages 5-7. In addition, in response to Applicants' arguments made in the Reply filed July 8, 2009, that Cahill merely teaches that the distance between the two opposite surfaces, not a coating, may be as small as 10 nm, the Office contends that "[i]f the distance between the opposite surfaces may be as small as 10 nm and '[o]ne or both said surfaces may comprise a coating of buffering molecules' it necessarily follows that the coating may be 10 nm or less. How the coating be thicker than the space the [sic] that contains it?" Office Action at page 2 (emphasis omitted). The Office further states that "Cahill is only used in the rejections as a secondary reference to show that pH gradients with a thickness of between 0.01-15  $\mu$ m were known at the time of the invention. So to make the pH gradient in Wiktorowicz 0.01-15  $\mu$ m is mere substitution of one known element for another to obtain predictable results." *Id.* at 3. Applicants respectfully disagree with and traverse the rejection for the reasons of record and for the following additional reasons.

First, Applicants reassert that Cahill does not explicitly teach a pH gradient with a thickness of between 0.01-15  $\mu\text{m}$ . In particular, as acknowledged by the Office, Cahill's coatings could not be thicker than the space (*i.e.*, the distance between the surfaces) that contains it. Nevertheless, Applicants note that Cahill also states that "[t]he distance between said surfaces is **typically** between 10 and 1000 nm [0.01-1.00  $\mu\text{m}$ ], **especially** between 10 and 500 nm [0.01 - 0.5  $\mu\text{m}$ ]. Extremely small distances between two planar surfaces can be maintained by columns of approximately 10 to 30 nm diameter which are created when the surrounded surface is removed by microetching." Cahill at paragraph [0010]. (emphasis added). Thus, coupling Cahill's teaching regarding the distance between the two surfaces and the Office's interpretation regarding the thickness of Cahill's coating, one of ordinary skill in the art would at best conclude that the thickness of Cahill's coating is typically less than 1000 nm (1  $\mu\text{m}$ ) or especially less than 500 nm (0.5  $\mu\text{m}$ ). Claim 1 of the present application, in contrast, recites "a separating coating with a thickness of between **0.01 and 15  $\mu\text{m}$**  carried on a substrate."

While the thickness of Cahill's coating falls within the range of 0.01 and 15  $\mu\text{m}$ , the Office fails to provide any reason whatsoever to support its allegation that a skilled artisan would be motivated to substitute Wiktorowicz's coating with Cahill's coating with a reasonable expectation of success to arrive at the presently claimed invention. Even if a skilled artisan had a reason to combine the teachings of Wiktorowicz and Cahill in the manner alleged by the Office, for the reasons discussed below, the combination would not have rendered the presently claimed invention obvious.

Cahill teaches a device that comprises a channel-like chamber, which "is encased by **two juxtaposed, especially opposite surfaces**, broken into homogenous

regions which are coated with molecules possessing a certain conductivity and buffer capacity at a given pH.” Cahill, paragraph [0010] (emphasis added). Likewise, Wiktorowicz teaches a device that comprises “[a] pair of plates . . . juxtaposed face to face to form an enclosed separation cavity 24, for holding a separation medium through which the sample is electrophoresed.” Wiktorowicz, col. 5, lines 23-28 and see also Figures 2 and 4. Thus, even if one of ordinary skill in the art would have combined the teachings of Wiktorowicz and Cahill, *arguendo*, that skilled person would inevitably arrive at a system comprising two juxtaposed, especially opposite surfaces.

A system that comprises two juxtaposed surfaces with channel-like chambers, however, is different from Applicants' system that does not require the second surface for forming a channel-like chamber for at least the following reasons. First, Cahill's system requires more buffer solution to fill the gap between the two juxtaposed surfaces as compared to Applicants' system that needs only sufficient amount of buffer to “soak” the pH active groups. Second, the molecules to be separated would experience a different electrical field within an open planar surface as in the present invention as opposed to the electrical field within a channel-like chamber as in Cahill's device. Third, the fluid dynamics established within an open planar surface is different from the fluid dynamics established within the two juxtaposed surfaces.

Moreover, as discussed earlier, Cahill relies on an electrophoretic volume encased by the two juxtaposed, especially opposite surfaces; thus, Cahill only envisages placing its coating within a channel-like chamber. Accordingly, even if one of ordinary skill in the art had any reason to “substitute” Wiktorowicz's coating with Cahill's coating, that person would simply arrive at a system comprising two juxtaposed,

especially opposite surfaces, which is apart from Applicants' claimed invention. Finally, when considering Wiktorowicz and Cahill as a whole, one of ordinary skill in the art would have had no reasonable expectation of successfully producing a device without two opposite surfaces for forming a channel-like chambers filled with buffers. For at least this reason, the Office has failed to establish a *prima facie* case of obviousness.

Zanzucchi or Simpson does not remedy the many deficiencies of Wiktorowicz and Cahill. In fact, the Office relies on Zanzucchi and Simpson solely for its teaching regarding a circular shape device. See Office Action at 7. Accordingly, the presently claimed invention is not obvious in view of Wikorowicz, Cahill, Zanzucchi, and Simpson. Applicants respectfully request the rejection be withdrawn.

## **2. Liu in view of Zanzucchi, Simpson, and Cahill**

The Examiner maintains the rejection of claim 1 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,676,819 to Liu et al. ("Liu"), Zanzucchi, Simpson, and Cahill for the reasons of record. See Office Action at 8-10. Applicants respectfully traverse the rejection for the reasons set forth below.

Liu is directed to separation systems involving capillary electrophoresis. See Liu col. 1, line 35-44. However, Liu does not teach a coating with a thickness of between 0.01 and 15  $\mu\text{m}$  as recited in claim 1. To remedy this deficiency, the Office again relies on Cahill. Nevertheless, as noted above, Cahill does not explicitly teach "a separating coating with a thickness of between 0.01 and 15  $\mu\text{m}$ ." Moreover, for the same reasons discussed above, a skilled artisan would not have arrived at the presently claimed invention by simply "substituting" Liu's coating with Cahill's coating because Liu, like Cahill, requires channel-like chambers in its device (see, e.g., Liu, col. 7, lines 19-29).

Lastly, neither Liu nor Cahill teaches a “disc shaped device being essentially circular comprising a centre, said microchannel structure being arranged around said centre” as recited in claim 1. Because Cahill fails to remedy the deficiencies of Liu, the combination of Cahill and Liu does not render the presently claimed device obvious.

The other two secondary references, Simpson and Zanzucchi, also fail to remedy the deficiencies of the combination of Liu and Cahill. Accordingly, the combination of the cited references could not have rendered the presently claimed device obvious. Applicants respectfully request the rejection be withdrawn.

### **3. Lee in view of Zanzucchi, Simpson, and Cahill**

The Examiner rejects claim 1 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,974,526 to Lee et al. (“Lee”), Zanzucchi, Simpson, and Cahill for the reasons of record. See Office Action at 10-12. Applicants respectfully disagree and traverse the rejection for at least the reason that Cahill, Simpson, and Zanzucchi do not remedy the deficiencies of Lee.

Like the other two primary references (Wiktorowicz and Liu), Lee does not teach a “disc shaped device being essentially circular comprising a centre, said microchannel structure being arranged around said centre” as recited in claim 1. Furthermore, nowhere does Lee teach a coating with a thickness of between 0.01 and 15  $\mu\text{m}$  as recited in claim 1. As detailed above, Cahill, Zanzucchi, and Simpson do not cure the many deficiencies of Lee at least because none of the cited references teach or suggest placing a separating coating with a thickness of between 0.01 and 15  $\mu\text{m}$  on the substrate of a separation system with an open planar surface. Accordingly, the Office

fails to establish a prima facie case of obviousness. Withdrawal of the rejection is respectfully requested.

### III. Conclusion

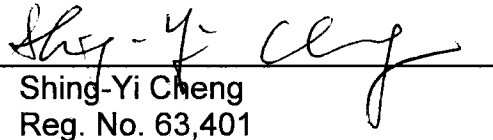
In view of the foregoing remarks, Applicants submit that the claimed invention is not obvious in view of the prior art references cited by the Office. Applicants therefore respectfully request reconsideration of this application and the timely allowance of the pending claim.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,  
GARRETT & DUNNER, L.L.P.

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By:   
Shing-Yi Cheng  
Reg. No. 63,401